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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
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10/580,048

05/19/2006

Kazuo Takahashi

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REED SMITH LLP

3110 FAIRVIEW PARK DRIVE, SUITE 1400

FALLS CHURCH, VA 22042

EXAMINER

WALBERG, TERESA J

ART UNIT

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3744

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**Please find below and/or attached an Office communication concerning this application or proceeding.**

The time period for reply, if any, is set in the attached communication.

<b>Office Action Summary</b>	<b>Application No.</b> 10/580,048	<b>Applicant(s)</b> TAKAHASHI ET AL.	
	<b>Examiner</b> Teresa J. Walberg	<b>Art Unit</b> 3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

### Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

### Status

- 1) ☒ Responsive to communication(s) filed on 23 April 2008.
- 2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

### Disposition of Claims

- 4) ☒ Claim(s) 1-5, 7-15 and 17-29 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-5, 7-15 and 17-29 is/are rejected.
- 7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

### Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 May 2006 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.  
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).  
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

### Priority under 35 U.S.C. § 119

- 12) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All    b) ☐ Some \*    c) ☐ None of:
1. ☒ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

### Attachment(s)

- |  |   |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892)          | 4) <input type="checkbox"/> Interview Summary (PTO-413)           |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____                                      |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08)          | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date _____  | 6) <input type="checkbox"/> Other: _____                          |

### DETAILED ACTION

1. Claims 12 and 21 are objected to because of the following informalities:

It appears that the last line of claim 12 should be amended to read "that guides said heat exchange medium to said discharge holes".

In claim 21, at lines 12-13, the phrase "housed in said storage container" is repeated.

Appropriate correction is required.

2. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

3. Claims 1, 2, 4, 5, 8, 11, 13-15, and 18 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922).

Barlow discloses a heat storage unit ( Fig. 6) including a storage container (12, 14, 16) that houses a heat storage body (86), which stores heat by a state change from solid to liquid (Fig. 7), a heat exchange medium (52) which exchanges heat by directly contacting the heat storage body (86), has a smaller specific gravity than that of the heat storage body and is separated from the heat storage body (Fig. 7), a supply pipe (18) that passes through at least the heat storage body housed in the storage container and supplied the heat exchange

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medium into the storage container (Fig. 6), a discharge pipe (46) that discharges the heat exchange medium, the supply pipe crosses a boundary surface between the heat exchange medium and the heat storage body (Fig. 6), has a plurality of discharge holes positioned inside the heat exchange medium (Fig. 7), the supply pipe crossing vertically with respect to the boundary surface (Fig. 7), at least a part of the supply pipe extending in the horizontal direction (Fig. 6), discharge holes being provided for an area extending in the horizontal direction such that the holes are open in the vertically downward direction (Fig. 9), the supply pipe having an expanded portion that widens toward the end (Fig. 7), the discharge pipe (46) includes a separation mechanism (94) that separates the heat storage body and the heat exchange medium, the supply pipe including a first supply pipe having discharge holes that discharge the supplied heat exchange medium into the heat storage body (Fig. 7), and a second supply pipe that crosses the boundary surface between the heat exchange medium and the heat storage body (Fig. 7), which are housed in the storage container, and has an outlet that discharges the supplied heat exchange medium into the heat exchange medium (Fig. 7), a switching valve (78, 80, 82, 84) for switching supply and cutoff of the heat exchange medium depending on the state of the heat storage body is provided severally for the first and second supply pipes (Fig. 7).

Barlow does not disclose at least part of the discharge pipe extending in a horizontal direction and the connection port of the supply pipe being positioned above a connection port of the discharge pipe.

Stuecheli discloses a heat storage device (Fig. 1) including at least part of a discharge pipe (18) extending in a horizontal direction and a connection port of the supply pipe (22) being positioned above a connection port of the discharge pipe (Fig. 1). It would have been obvious in view of Stuecheli to provide at least part of the discharge pipe extending in a horizontal direction and the connection port of the supply pipe being positioned above a connection port of the discharge pipe in the heat storage device of Barlow, the motivation being to enable easier connection of the pipes to external connectors.

4. Claims 1-4, 11, and 14 are rejected under 35 U.S.C. 102(b) as being anticipated by Lindner et al (4,086,958) in view of Stuecheli (GB 2,049,922).

Lindner et al disclose a heat storage unit (Fig. 2) including a storage container (21) that houses a heat storage body (22), which stores heat by a state change from solid to liquid (Fig. 3), a heat exchange medium (28) which exchanges heat by directly contacting the heat storage body (22), has a smaller specific gravity than that of the heat storage body and is separated from the heat storage body (Fig. 3), a supply pipe (31, 33) that passes through at least the heat storage body housed in the storage container and supplied the heat exchange medium into the storage container (Fig. 2), a discharge pipe (29) that discharges the heat exchange medium, the supply pipe (33) crosses a boundary surface between the heat exchange medium and the heat storage body (Fig. 2), has a plurality of discharge holes positioned inside the heat exchange medium

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(Fig. 3), the supply pipe crossing vertically with respect to the boundary surface (Fig. 3), the supply pipe being disposed coaxially around the circumference of an area having the discharge holes (Fig. 3) and has a circulation pipe to allow the heat exchange medium discharged from the discharge holes to go up in the vertical direction (Fig. 3), at least a part of the supply pipe extending in the horizontal direction (Fig. 6), discharge holes being provided for an area extending in the horizontal direction such that the holes are open in the vertically downward direction (26 in Fig. 3), and a second supply pipe (33) that crosses the boundary surface between the heat exchange medium and the heat storage body (Fig. 2), which are housed in the storage container, and has an outlet that discharges the supplied heat exchange medium into the heat exchange medium (Fig. 2).

Lindner et al does not disclose the connection port of the supply pipe being positioned above a connection port of the discharge pipe.

Stuecheli discloses a heat storage device (Fig. 1) including a connection port of the supply pipe (22) being positioned above a connection port of the discharge pipe (Fig. 1). It would have been obvious in view of Stuecheli to provide a connection port of the supply pipe positioned above a connection port of the discharge pipe in the heat storage device of Lindner et al, the motivation being to enable easier connection of the pipes to external connectors.

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6. Claims 10 and 20 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and further in view of Kakiuchi et al (5,785,885).

Barlow in view of Stuecheli discloses a heat storage unit having the structure claimed, with the exception of the material of the heat storage body being erythritol. Kakiuchi et al teaches using erythritol as a heat storage material (see abstract). It would have been obvious in view of Kakiuchi et al to use erythritol as the heat storage material in the heat storage unit of Barlow in view of Stuecheli, since Kakiuchi et al teach that erythritol has improved heat storage characteristics.

8. Claims 7 and 17 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and further in view of Noji et al (4,953,330).

Barlow in view of Stuecheli discloses a heat storage unit having the structure claimed, with the exception of vertical wave absorbing plates arranged in parallel. Noji et al teaches providing vertical wave absorbing plates in a liquid tank (Fig. 15). It would have been obvious in view of Noji et al to provide wave absorbing plates in the heat storage unit of Barlow in view of Stuecheli, the motivation being to prevent splashing of the liquids.

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8. Claims 9 and 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and further in view of Strasser (WO 03/019099)(cited by applicant).

Barlow in view of Stuecheli discloses a heat storage unit having the structure claimed, with the exception of the structure of the separation mechanism. Strasser discloses a heat storage unit having a separation device (8) as claimed (Fig. 1). It would have been obvious in view of Strasser to provide such a separation mechanism in the heat storage unit of Barlow in view of Stuecheli, the motivation being to prevent loss of the heat storage material.

8. Claims 12, 21-25, and 27 are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and further in view of Strahle et al (6,056,043).

Barlow in view of Stuecheli discloses a heat storage unit having the structure claimed, with the exception of a second supply pipe surrounding at least a part of the first supply pipe including the discharge holes and has a communication portion that guides the heat exchange medium to the discharge holes and the supply pipe provided on and covering the bottom surface of the container.

Strahle et al disclose a heat storage unit (see abstract) having a second supply pipe (94 in Fig. 14) surrounding at least a part of the first supply pipe (90)



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including the discharge holes (92) and has a communication portion that guides the heat exchange medium to the discharge holes (96).

It would have been obvious in view of Strasser to provide such a supply distribution pipe in the heat storage unit of Barlow in view of Stuecheli, the motivation being to better distribute the input material.

With regard to claims 23 and 24, it would have been obvious to one of ordinary skill in the art to position the supply pipe on the bottom surface of the container and covering the bottom surface, the motivation being to enable increased distribution of the input fluid.

8. Claim 26 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and Strahle et al (6,056,043) and further in view of Noji et al (4,953,330).

Barlow in view of Stuecheli and Strahle et al discloses a heat storage unit having the structure claimed, with the exception of vertical wave absorbing plates arranged in parallel. Noji et al teaches providing vertical wave absorbing plates in a liquid tank (Fig. 15). It would have been obvious in view of Noji et al to provide wave absorbing plates in the heat storage unit of Barlow in view of Stuecheli and Strahle et al, the motivation being to prevent splashing of the liquids.

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8. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and Strahle et al (6,056,043) and further in view of Strasser (WO 03/019099)(cited by applicant).

Barlow in view of Stuecheli discloses a heat storage unit having the structure claimed, with the exception of the structure of the separation mechanism. Strasser discloses a heat storage unit having a separation device (8) as claimed (Fig. 1). It would have been obvious in view of Strasser to provide such a separation mechanism in the heat storage unit of Barlow in view of Stuecheli and Strahle et al, the motivation being to prevent loss of the heat storage material.

8. Claim 29 is are rejected under 35 U.S.C. 103(a) as being unpatentable over Barlow (4,219,072) in view of Stuecheli (GB 2,049,922) and Strahle et al (6,056,043) and further in view of Kakiuchi et al (5,785,885).

Barlow in view of Stuecheli and Strahle et al discloses a heat storage unit having the structure claimed, with the exception of the material of the heat storage body being erythritol. Kakiuchi et al teaches using erythritol as a heat storage material (see abstract). It would have been obvious in view of Kakiuchi et al to use erythritol as the heat storage material in the heat storage unit of Barlow in view of Stuecheli and Strahle et al, since Kakiuchi et al teach that erythritol has improved heat storage characteristics.

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4. Applicant's arguments, filed 23 April 2008, with respect to claims 1-5, 7-15, and 17-29, that the applied references do not disclose at least a part of the discharge pipe extending in a horizontal direction and a connection port of the supply pipe being positioned above a connection port of the discharge pipe, and that such structure would not have been obvious, have been fully considered and are persuasive. Therefore, the rejection has been withdrawn. However, upon further consideration, a new ground(s) of rejection is made in view of Stuecheli (GB 2,049,922), which discloses an analogous device which includes a discharge pipe extending in a horizontal direction and a connection port of a supply pipe being positioned above a connection port of a discharge pipe.

5. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Teresa J. Walberg whose telephone number is 571-272-4790. The examiner can normally be reached on M-F 8:00 - 4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler can be reached on 571-272-4834. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

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Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Teresa J. Walberg/  
Primary Examiner, Art Unit 3744

/TW/